Dieting and Gallstones

NIDDK

National Institute of Diabetes and Digestive and Kidney Diseases

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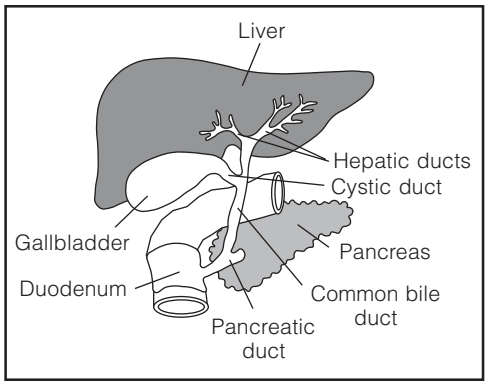
WIN *Weight-control Information Network*

What are gallstones?

Gallstones are clusters of solid material that form in the gallbladder. They are made mostly of cholesterol. Gallstones may occur as one large stone or as many small ones. They vary in size and may be as large as a golf ball or as small as a grain of sand.

Experts estimate that 16 to 22 million people in the United States have gallstones—as many as one in every 12 Americans. Most people with gallstones do not know that they have them and experience no symptoms. Painless gallstones are called *silent gallstones*. Sometimes gallstones can cause abdominal or back pain. These are called *symptomatic gallstones*. In rare cases, gallstones can cause serious health problems. Symptomatic gallstones result in about 800,000 hospitalizations and more than 500,000 operations each year in the U.S.

What causes gallstones?



Gallstones develop in the gallbladder, a small pear-shaped organ beneath the liver on the right side of the abdomen. The gallbladder is about 3 inches long and an inch wide at its thickest part. It stores and releases bile into the intestine to help digestion. Bile is a liquid made by the liver. It contains water, cholesterol, bile salts, fats, proteins, and bilirubin, a bile pigment. During digestion, the gallbladder contracts to release bile into the intestine where the bile salts help to break down fat. Bile also dissolves excess cholesterol.

According to researchers, gallstones may form in one of three ways: when bile contains more cholesterol than it can dissolve, when there is too much of certain proteins or other substance in the bile that causes cholesterol to form hard crystals, or when the gallbladder does not contract and empty its bile regularly.

What are the symptoms of gallstones?

Some common symptoms of gallstones or gallstone attack include:

- severe pain in the upper abdomen that starts suddenly and lasts from 30 minutes to many hours
- pain under the right shoulder or in the right shoulder blade

If you are overweight or obese, you can lower your risk for type 2 diabetes, heart disease, stroke, and some forms of cancer by losing weight. People who are overweight are at greater risk for developing gallstones than people who are at a healthy weight. When choosing a weight-loss program, be aware that the risk for developing gallstones increases with quick weight loss or a large weight loss. Gradual weight loss can lower the risk for obesity-related gallstones.

- nausea or vomiting
- indigestion after eating high-fat foods, such as fried foods or desserts

Is obesity a risk factor for gallstones?

Obesity is a strong risk factor for gallstones, especially among women. People who are obese are more likely to have gallstones than people who are at a healthy weight. Body mass index (BMI) can be used to measure obesity in adults. BMI is calculated from this equation: weight in pounds x 703, divided by height in inches x height in inches. The table below calculates BMI for you. A BMI of 18.5 to 24.9 refers to a healthy weight, a BMI of 25 to 29.9 refers to overweight, and a BMI of 30 or higher refers to obese.

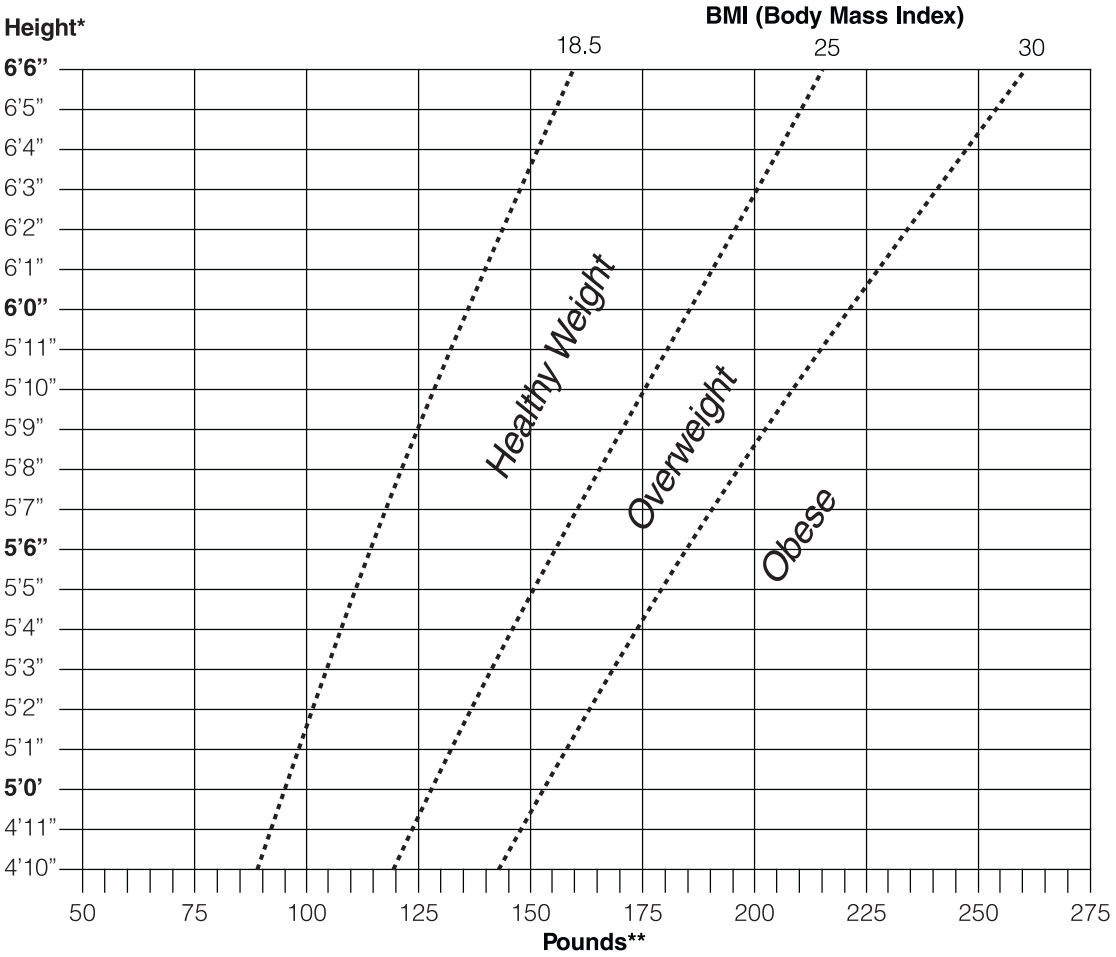
As BMI increases, the risk for developing gallstones also rises. Studies have shown that risk may triple in women who have a BMI greater than 32 compared to those with a BMI of 24 to 25. Risk may increase sevenfold in women with a BMI greater than 45 compared to those with a BMI less than 24.

Researchers have found that people who are obese may produce high levels of cholesterol. This leads to the production of bile containing more cholesterol than it can dissolve. When this happens, gallstones can form. People who are obese may also have large gallbladders that do not empty normally or completely. Some studies have shown that men and women who carry fat around their midsections may be at a greater risk for developing gallstones than those who carry fat around their hips and thighs.

Is weight-loss dieting a risk factor for gallstones?

Weight-loss dieting increases the risk of developing gallstones. People who lose a large amount of weight quickly are at greater risk than those who lose weight more slowly. Rapid weight loss may also cause silent gallstones to become symptomatic. Studies have shown that people who lose more than 3 pounds per week may have a greater risk of developing gallstones than those who lose weight at slower rates.

A very low-calorie diet (VLCD) allows a person who is obese to quickly lose a large amount of weight. VLCDs usually provide about 800 calories or less per day in food or liquid form, and are followed for 12 to 16 weeks under



Find your weight on the bottom of the graph. Go straight up from that point until you come to the line that matches your height. Then look to find your weight group.

* Without shoes
** Without clothes

the supervision of a health care provider. Studies have shown that 10 to 25 percent of people on a VLCD developed gallstones. These gallstones were usually silent—they did not produce any symptoms. About one-third of the dieters who developed gallstones, however, did have symptoms and some of these required gallbladder surgery.

Experts believe dieting may cause a shift in the balance of bile salts and cholesterol in the gallbladder. The cholesterol level is increased and the amount of bile salts is decreased. Following a diet too low in fat or going for long periods without eating (skipping breakfast, for example), a common practice among dieters, may also decrease gallbladder contractions. If the gallbladder does not contract often enough to empty out the bile, gallstones may form.

Is weight cycling a risk factor for gallstones?

Weight cycling, or losing and regaining weight repeatedly, may increase the risk of developing gallstones. People who weight cycle—especially with losses and gains of more than 10 pounds—have a higher risk for gallstones than people who lose weight and maintain their weight loss. In addition, the more weight a person loses and regains during a cycle, the greater the risk of developing gallstones.

Why weight cycling is a risk factor for gallstones is unclear. The rise in cholesterol levels during the weight loss phase of a weight cycle may be responsible.

Is surgery to treat obesity a risk factor for gallstones?

Gallstones are common among people who undergo gastrointestinal surgery to lose weight, also called *bariatric surgery*. Gastrointestinal surgery to reduce the size of the stomach or bypass parts of the digestive system is a weight-loss method for people who have a BMI above 40. Experts estimate that one-third of patients who have bariatric surgery develop gallstones. The gallstones usually develop in the first few months after surgery and are symptomatic.

How can I safely lose weight and decrease the risk of gallstones?

You can take several measures to decrease the risk of developing gallstones during weight loss. Losing weight gradually, instead of losing a large amount of weight quickly, lowers your risk. Experts recommend losing 1 to 2 pounds per week. You can also decrease the risk of gallstones associated with weight cycling by aiming for a modest weight loss that you can maintain. Even a loss of 10 percent of body weight over a period of 6 months or more can improve the health of an adult who is overweight or obese.

Your food choices can also affect your gallstone risk. Experts recommend including some fat in your diet to stimulate gallbladder contracting and emptying. However, no more than 30 percent of your total calories should come from fat. Studies have also shown that diets high in fiber and calcium may reduce the risk of gallstone development. Finally, regular physical activity is related to a lower risk for gallstones.

What is the treatment for gallstones?

Silent gallstones are usually left alone and sometimes disappear on their own. Symptomatic gallstones are usually treated. The most common treatment is surgery to remove the gallbladder. This operation is called a *cholecystectomy*. In other cases, drugs are used to dissolve the gallstones. Your health care provider can help determine which option is best for you.

Are the benefits of weight loss greater than the risk of getting gallstones?

Although weight loss increases the risk of developing gallstones, obesity poses an even greater risk. In addition to gallstones, obesity is linked to many serious health problems including:

- type 2 diabetes
- high blood pressure
- heart disease
- stroke
- certain types of cancer
- sleep apnea (when breathing stops for short periods during sleep)
- osteoarthritis (wearing away of the joints)
- gastro-esophageal reflux disease (GERD)

For people who are obese, weight loss can lower the risk of developing these illnesses. Even a small weight loss of 10 to 20 pounds can improve health and lower disease risk. In addition, weight loss can bring other benefits such as better mood and positive self-image.

If you are thinking about starting an eating and physical activity plan to lose weight, talk with your health care provider first. Together, you can discuss various eating and exercise programs, your medical history, and the benefits and risks of losing weight including the risk of developing gallstones.

Additional Reading

Acalovschi M. "Cholesterol gallstones: From epidemiology to prevention." *Postgraduate Medicine*, 2001: Vol. 77, No. 906, pp. 221-229. This review article, intended for health professionals, describes the causes, risk factors, and pathogenesis of gallstones, and provides information on prevention.

Erlinger S. "Gallstones in obesity and weight loss." *European Journal of Gastroenterology Hepatology*, 2000: Vol. 12, No. 12, pp. 1347-1352. This review article, intended for health professionals, describes the relationships of diet, weight reduction, and obesity to the development of gallstones. It also describes the pathophysiology of gallstones and recommendations for treatment and prevention.

Gallstones. NIH Publication No. 99-2897. This fact sheet provides basic information about gallstones and treatment options. Published by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and available through the National Digestive Diseases Information Clearinghouse (NDDIC), 2 Information Way, Bethesda, MD, 20892-3570, Tel: 1-800-891-5389.

Gastrointestinal Surgery for Severe Obesity. NIH Publication No. 01-4006. This fact sheet provides basic information about bariatric surgery including benefits and risks. Published by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and available through the Weight-control Information Network (WIN), 1 WIN Way, Bethesda, MD, 20892-3665, Tel: 1-877-946-4627.

Nutrition and Your Health: Dietary Guidelines for Americans, 2000, 5th Edition. Published by the United States Department of Agriculture (USDA) and the United States Department of Health and Human Services (DHHS) and for sale by the U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328, or by calling the Federal Consumer Information Center at 1-888-878-3256.

Weight Cycling. NIH Publication No. 01-3901. This fact sheet provides general information about weight cycling and associated health risks. Published by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and available through the Weight-control Information Network (WIN), 1 WIN Way, Bethesda, MD, 20892-3665, Tel: 1-877-946-4627.

Weight Loss for Life. NIH Publication No. 00-3700. June 2000. Published by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and available through the Weight-control Information Network (WIN), 1 WIN Way, Bethesda, MD 20892-3665, Tel: 1-877-946-4627.

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The Weight-control Information Network (WIN) is a national service of the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health, which is the Federal Government's lead agency responsible for biomedical research on nutrition and obesity. Authorized by Congress (Public Law 103-43), WIN provides the general public, health professionals, the media, and Congress with up-to-date, science-based health information on weight control, obesity, physical activity, and related nutritional issues.

WIN answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about weight control and related issues.

Publications produced by WIN are carefully reviewed by both NIDDK scientists and outside experts. This fact sheet was also reviewed by Roland Weinsier, M.D., Dr.P.H., Professor and Director, Clinical Nutrition Research Center, University of Alabama at Birmingham; Arthur Frank, M.D., The George Washington University Weight Management Program; and Henry Pitt, M.D., Chair of Surgery, Medical College of Wisconsin.

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This fact sheet is also available at *www.niddk.nih.gov/health/nutrit/nutrit.htm*.